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Citation for published version:
Simpson, CR, Newton, J, Hippisley-Cox, J & Sheikh, A 2009, 'Trends in the epidemiology and prescribing of medication for eczema in England', *Journal of the Royal Society of Medicine*, vol. 102, no. 3, pp. 108-17. https://doi.org/10.1258/jrsm.2009.080211

Digital Object Identifier (DOI):
10.1258/jrsm.2009.080211

Link:
Link to publication record in Edinburgh Research Explorer

Document Version:
Early version, also known as pre-print

Published In:
Journal of the Royal Society of Medicine

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Download date: 05. May. 2023

Trends in the epidemiology and prescribing of medication for eczema in England

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DECLARATIONS

Competing interests
JHC is Director of QRESEARCH (a not-for-profit organization owned by the University of Nottingham and EMIS, commercial supplier of computer systems for 60% of GP practices in the UK)

Funding
NHS Health and Social Care Information Centre

Ethical approval
Not applicable

Guarantor
JHC

Contributorship
AS, JHC and JN were involved in designing the study and CS contributed to literature searches and led the drafting of the paper

Summary

Background The prevalence of eczema, particularly in younger children, increased substantially over the second half of the 20th century. Analysis of primary healthcare data-sets offers the possibility to advance understanding about the changing epidemiology of eczema.

Aim To investigate recent trends in the recorded incidence, lifetime prevalence, prescribing and consulting behaviour of patients with eczema in England.

Methods QRESEARCH is one of the world's largest national aggregated health databases containing the records of over nine million patients. We extracted data on all patients with a recorded diagnosis of eczema and calculated annual age–sex standardized incidence and lifetime period prevalence rates for each year from 2001–2005. We also analysed the consulting behaviour of these patients when compared with the rest of the QRESEARCH database population. The number of eczema prescriptions issued to people in England was also estimated.

Results The age–sex standardized incidence of eczema was 9.58 per 1000 person-years in 2001 and increased to 13.58 per 1000 patients in 2005 ($p<0.001$). By 2005, eczema affected an estimated 5,773,700 (95% confidence intervals [CI] 5,754,100–5,793,400) individuals in England, who, on average, consulted a general practitioner 4.02 (95% CI 4.01–4.03) times a year. During the study period, the number of eczema related prescriptions increased by 56.6% (95% CI 56.6–56.7), so by 2005 an estimated 13,690,300 (95% CI 13,643,200–13,737,600) prescriptions were issued.

Conclusions Recorded incidence and lifetime prevalence of eczema in England continue to increase. Similar increases have also been observed in the estimated number of eczema prescriptions issued to the English population.

with all co-authors commenting on drafts of the manuscript

Acknowledgements

We would like to record our thanks to the contributing EMIS practices and patients and for EMIS for providing technical expertise in creating and maintaining QRESEARCH. We thank QRESEARCH staff (Govind Jumbu, Alex Porter, Justin Fenty, Mike Heaps and Richard Holland) for their contribution to data extraction, analysis and presentation. These findings have been reported in *Primary care epidemiology of allergic disorders: analysis using QRESEARCH database 2001–2006*, which is published by the NHS Health and Social Care Information Centre

Introduction

A recent review of UK epidemiological data revealed that there has been an inexorable rise in the prevalence of allergic disorders.[1] Allergic pathophyisiology can cause a spectrum of diseases in individuals, which may vary in severity. Eczema is an inflammatory skin disorder often resulting in red, itchy and poorly-defined patches occurring on flexural surfaces, and is most commonly found in children of preschool age. Atopic eczema has been defined as a chronic, relapsing, inflammatory skin condition associated with epidermal barrier dysfunction, which in turn is in many cases increasingly believed to result from an underlying filaggrin gene defect.[2] Individuals can also exhibit eczema without atopic features (i.e. non-atopic eczema); such patients will respond to treatments such as creams containing corticosteroids and emollients just as well as individuals with atopic eczema. Individuals with atopic eczema are however – unlike those with non-atopic eczema – more likely to develop other atopic diseases such as asthma or hayfever later in life,[3] and their eczema is often severe and more likely to persist into adulthood.[4]

Survey data provide useful information on variations in lifetime/period prevalence of self-reported diagnoses of eczema, particularly in children and adolescents. However there are relatively few reliable national data describing clinician-diagnosed disease incidence; furthermore very few data exist on the overall population trends over time for all ages. Exploitation of large national healthcare data-sets, with their key strengths of large numbers and representative data, offers an important opportunity to develop insights into the epidemiology of eczema.[5] Studying primary care databases provides a picture of overall national trends – something that is not possible with large scale surveys such as ISAAC, which has studied only children,[6] and the ECRHS, which has surveyed only adults.[7] Large primary care data-sets such as QRESEARCH, recording information at the point at which the majority of patients with eczema are likely to be managed, do however offer an important opportunity to study changing patterns of disease. Building on previous work,[8–10] we sought to describe recent trends in the primary care diagnosis, prescribing and consulting behaviours of patients with eczema in England.

Methods

Version 10 of the QRESEARCH database was used for these analyses. This database contains representative anonymized aggregated health data derived from 525 general practices throughout England. Data were available for the period 1 January 1999 to 31 December 2005, these comprising over nine million individual patients who collectively contributed over 30 million patient-years of observation. The methods used to collect primary care data for the QRESEARCH database have been previously described.[8]

Patients were included in the analysis year if they were registered for the entire year of study. Patients with incomplete data (i.e. temporary residents, newly-registered patients and those who joined, left or died during the study year) were excluded. Patients were considered to have eczema if they had a relevant computer-recorded diagnostic Read code in their electronic health record during the time period of interest.

Incidence was defined as the number of patients with a new case of eczema diagnosed in a specific year, with the denominator being the number of patient-years of observation (calculated from the number of patients registered with practices and their length of registration). Lifetime prevalence was defined as the number of people with eczema ever recorded on at least one occasion in the general practice records; the denominator used to calculate the lifetime prevalence rate was the number of patients registered with the study practices.

In order to describe trends in prescribing of eczema medication, we extracted prescribing data and estimated numbers of eczema prescriptions issued to all patients listed in chapters 13.2, 13.4 and 13.5 of the British National Formulary (emollient and barrier preparations, topical steroids, and psoriasis and eczema treatments). Although estimated prescriptions issued to the whole English population may equate with the numbers of prescriptions dispensed nationally, these figures are not directly comparable to Prescribing Analysis and Cost Tabulation (PACT) data.

In order to compare our results on the rates and trends of eczema in England with other published data, a structured literature review was carried out. We conducted our search using Medline and Embase (from 1951 to December 2008), and also

Box 1
Eczema Read codes used in the analysis

Read codes	*Read term*
M11	Atopic dermatitis and related conditions
M110	Napkin dermatitis
M1100	Candidal nappy rash
M111	Atopic dermatitis/eczema
M112	Infantile eczema
M113	Flexural eczema
M114	Allergic (intrinsic) eczema
M115	Besnier's prurigo
M116	Neurodermatitis – diffuse
M117	Neurodermatitis – atopic
M118	Infantile seborrhoeic dermatitis
M1180	Infantile seborrhoeic dermatitis capitis
M118z	Infantile seborrhoeic dermatitis NOS
M119	Discoid eczema
M11z	Atopic dermatitis NOS
M12z	Contact dermatitis NOS
M12z0	Dermatitis NOS
M12z1	Eczema NOS
M12z2	Infected eczema
M12z3	Hand eczema
M12z4	Erythrodermic eczema
M12zz	Contact dermatitis NOS

Google Scholar. The search terms used included: eczema, trends, prevalence and incidence.

Definitions

Eczema was defined as patients who have Read codes M11 and below and M12z and below (see Box 1 for Read codes used).

Statistical methods

As a result of known age and sex variations, rates of disease and prescribing were standardized by sex and five-year age bands. The mid-year population estimates for England in each year of study were used as the reference population. These results were then used to estimate the numbers of people with eczema in England. The Mantel-Haenszel χ^2 test was used to investigate trends over time, this analysis being undertaken using EpiInfo2000 (World Health Organization, Geneva, Switzerland).

Table 1
Incidence of eczema

Year	*Age–sex standardized lifetime incidence rate per 1000 patient-years*	*95% CI*
2001	9.58	9.46–9.70
2002	10.40	10.28–5.30
2003	11.62	11.49–11.52
2004	13.38	13.24–13.52
2005	13.58	13.45–13.72

Results

Incidence rate of eczema and changes over time

During the five-year study period the number of incident cases per 1000 population increased by 41.8% ($p<0.001$; Table 1). In 2005, approximately 1 in every 74 people in England was newly diagnosed as having eczema.

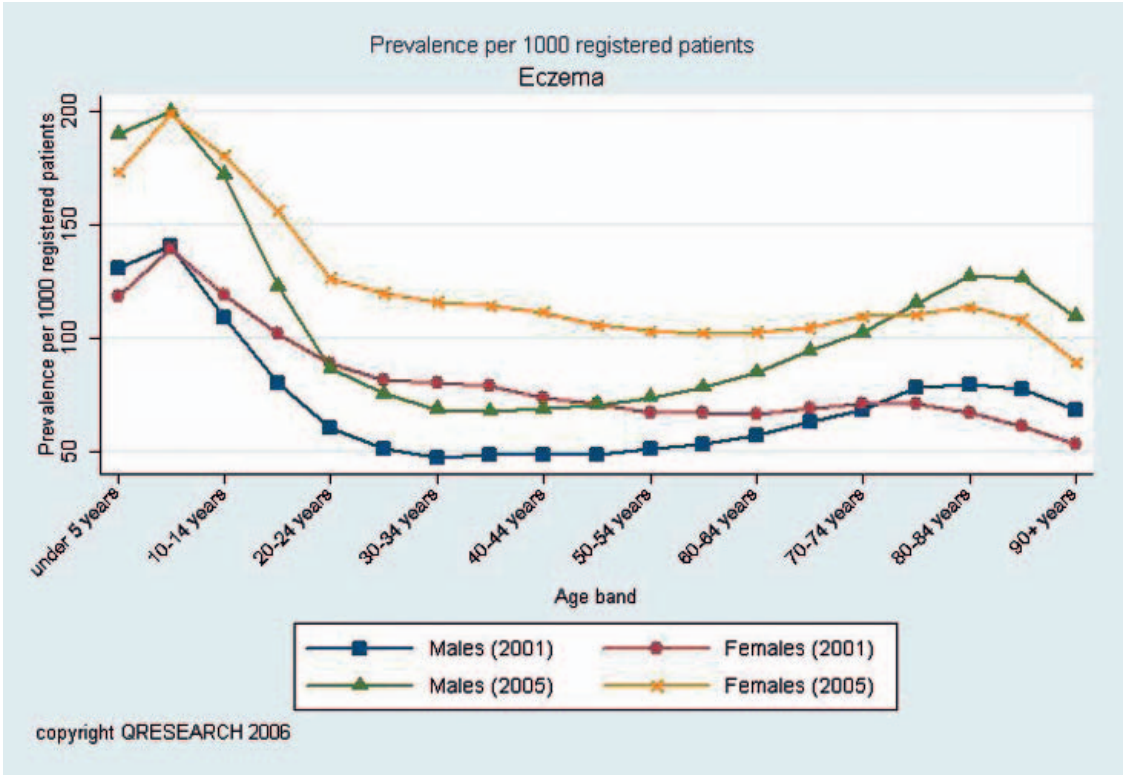
Age–sex standardization of lifetime prevalence of patients with eczema and changes over time

Between 2001 and 2005, there was a significant increase in the number of registered patients with a diagnosis of eczema at some point in their lives (Figure 1). The age–sex standardized lifetime prevalence rate of eczema increased for the whole population over each of the five years of interest, with an overall 48.2% increase ($p<0.001$; Table 2). In 2005, eczema affected an estimated 5,773,700 (95% confidence intervals [CI] 5,754,100–5,793,400) or about 1 in 9 people in England. It was more common in girls/women than in boys/men, except in children aged under five years or those aged over 75 years. In 2005, the highest lifetime prevalence rate occurred in boys aged 5–9 years (Figure 1).

Consultation rates for any reason for patients with eczema

Table 3 compares general practitioner (GP) and nurse consultation rates for patients with eczema. Figure 2 compares overall consultation rates for the whole QRESEARCH population with those for patients with eczema broken down by age and sex. This includes all GP and nurse consultations in 2005, regardless of the reason for the encounter. Consultation rates for women tended to be higher

Figure 1
Lifetime prevalence of eczema per 1000 patients



than for men, and consultation rates for patients with eczema were higher than overall consultation rates. For example, for men aged 85–89 years, the GP and nurse consultation rate for patients with a diagnosis of eczema was 1.3 times higher than the corresponding overall consultation rate in that group of patients.

Figure 3 shows consultation rates per patient (regardless of the reason for the consultation) for eczema broken down by age and sex. The highest consultation rate occurred in women aged 85–89 years.

Table 2
Lifetime prevalence of eczema

Year	*Age–sex standardized lifetime prevalence rate per 1000*	*95% CI*
2001	77.78	77.46–78.11
2002	85.96	85.62–86.30
2003	95.14	94.78–95.50
2004	105.50	105.13–105.88
2005	115.26	114.87–115.65

Prescriptions for eczema treatments

Table 4 shows the estimated number of eczema prescriptions issued to the whole population in the years 2001 to 2005. Overall there was an increase of 56.6% (95% CI 56.6–56.7) in the number of prescriptions issued (emollient and barrier preparations increase: 78.7% (95% CI 78.6–78.7); topical corticosteroids: 36.4% (95% CI 36.3–36.4); and psoriasis and eczema: 20.7% (95% CI 20.7–20.8)).

Discussion

This study, using routine data from one of the world's largest national data-sets, has revealed that eczema occurs very commonly in children and adults, and that, in the beginning of the new millennium, a large increase has occurred in the recorded incidence and lifetime prevalence (in all

Table 3
Consultation rates for eczema patients per person per year by clinician by year

Year	*Age–sex standardized consultation rate per person per year (95% confidence intervals)*	
	General practitioner	*Nurse*
2001	3.77(3.76–3.78)	1.22(1.21–1.22)
2002	3.83(3.82–3.83)	1.35(1.35–1.36)
2003	3.94(3.93–3.95)	1.47(1.46–1.47)
2004	4.01(4.00–4.02)	1.53(1.52–1.53)
2005	4.02(4.01–4.03)	1.62(1.61–1.62)

ages) of these problems. The number of consultations for eczema and eczema-related prescriptions issued in primary care in England has also increased during the study period. The consultation rate also seemed to be higher than the overall population and persisted into adulthood, when, in the majority of cases, eczema is no longer likely to be as problematic.

Main strengths and limitations of this work

The main strengths of this study include our interrogation of an extremely large nationally representative data-set, the fact that all contributing practices used the same computing systems for electronically recording clinical data, and the approach used to ensure that all contributing practices were accustomed to electronically recording routine data. The study design employed ensured that there was no risk of selection bias due to non-responders or recall bias. Another strength of this study was the use of contemporaneous clinician recording of a diagnosis of eczema as opposed to patient self-reporting of historical diagnoses or symptoms.[6,7]

There are a number of limitations related to the use of large routinely collected data from primary care, including the dependence on clinician-recorded diagnosis of eczema and possible improvements in recording over the study time

Figure 2
Overall consultation rates compared with those for eczema, for all GP and nurse consultations in 2005

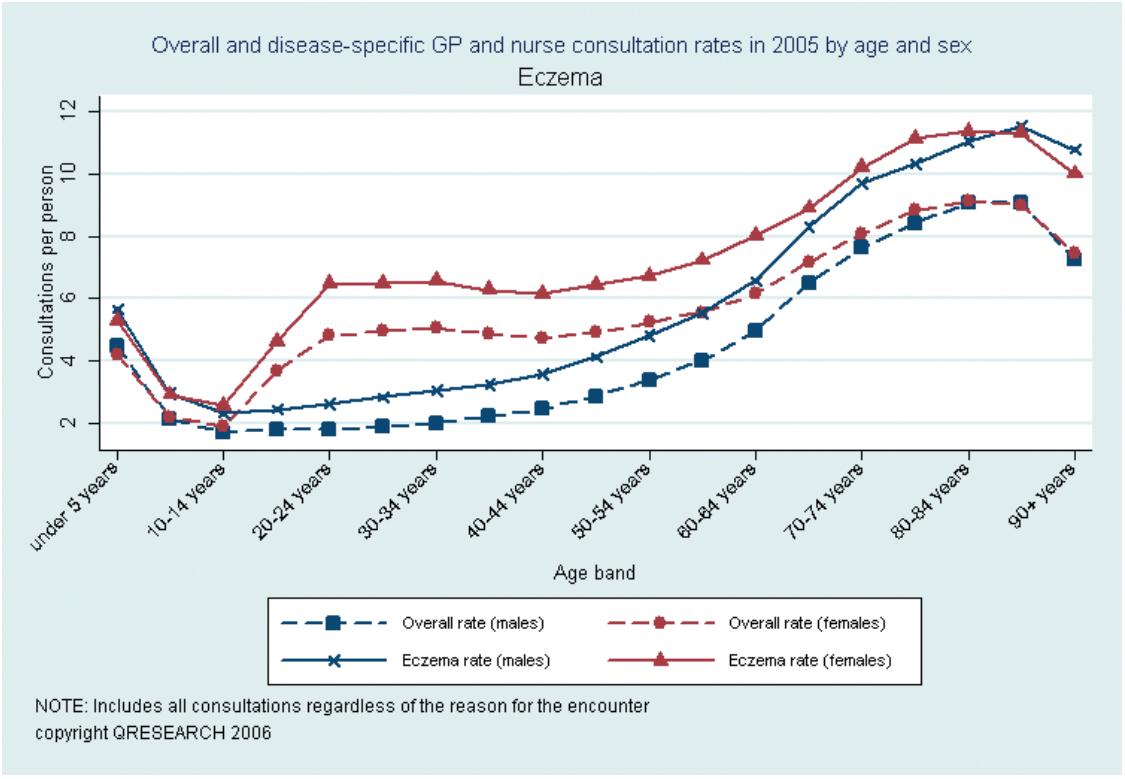
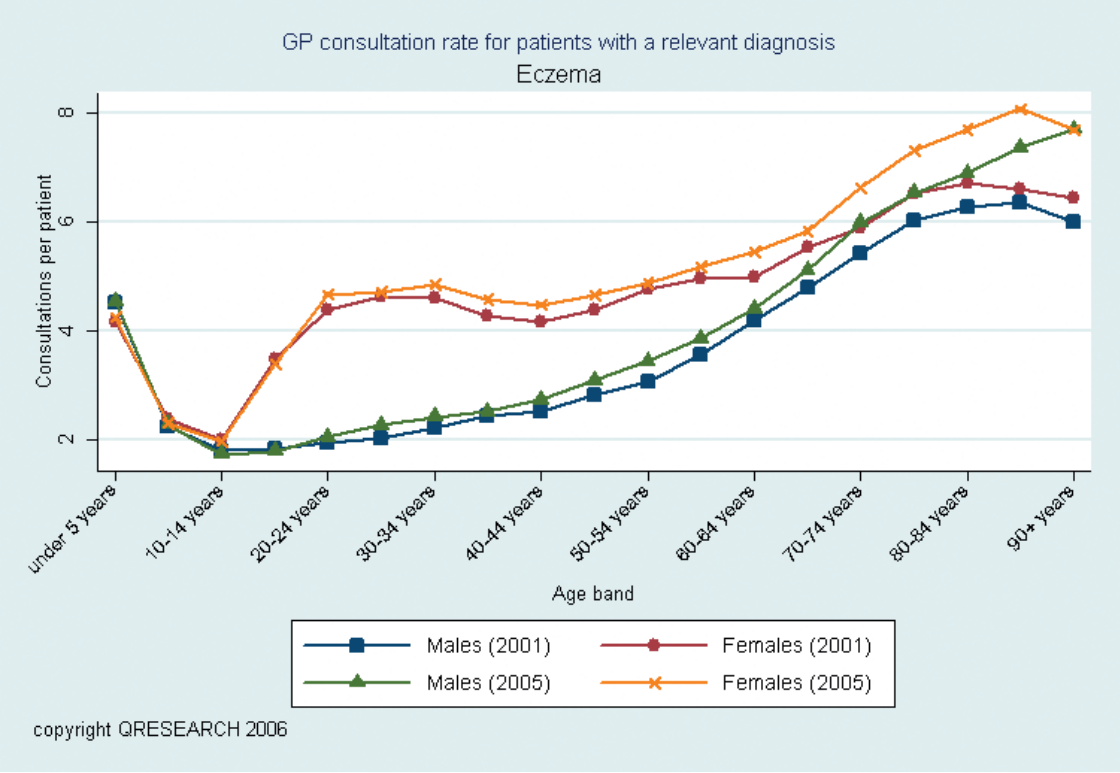


Figure 3
Overall GP consultation rates (regardless of the reason for the consultation) for patients with eczema in 2001 and 2005



period. The relatively short time window over which trends were studied is another limitation, but this does also have the advantage of confining analysis to a period during which there were no changes in disease definition or classification. Data regarding childhood prevalence may be underestimated, as the ascertainment of disease present in the community will be dependent on parents bringing their children for consultation.[11] Underestimates of eczema prevalence have been compounded by some individuals with mild disease not consulting, opting to use either no treatment or over-the-counter preparations. The inadequacy of Read codes for allergy has been previously reported[12] and although it is difficult to quantify the precise effect of this, it is likely to have contributed to an underestimate in relation to the actual population prevalence of eczema. However this inadequacy is unlikely to have had any effect on the increasing trends of eczema, as no changes in Read codes for eczema have been introduced during the study period.

Comparison of findings with other published work

Table 5 compares previous published epidemiological data for eczema. We have found using data from our work that the lifetime clinician-recorded prevalence peaks in younger children mirrored results from a birth cohort,[13] and the prevalence in our older adults was similar to that found in survey data.[7] Although little data on the trend of eczema prevalence exist prior to World War II (1939–1945), the prevalence of eczema increased substantially in the latter half of the 20th century, with eczema in school-aged children being found to increase between the late 1940s and 2000.[14–16] In contrast to our results, survey studies (see Box 2

Table 4
Total estimated count of eczema-related prescriptions for all people in England

Year	*Prescription*	*Estimated number of prescriptions in England*	*95% confidence intervals*
2001	Emollient and Barrier Preparations (BNF chapter 13.2)	4,267,300	4,249,700–4,285,000
	Topical Corticosteroids (BNF chapter 13.4)	4,271,700	4,254,500–4,289,000
	Psoriasis And Eczema (BNF chapter 13.5)	200,200	196,600–203,900
2002	Emollient and Barrier Preparations (BNF chapter 13.2)	4,841,300	4,822,600–4,860,000
	Topical Corticosteroids (BNF chapter 13.4)	4,543,500	4,525,800–4,561,200
	Psoriasis And Eczema (BNF chapter 13.5)	208,100	204,400–211,800
2003	Emollient and Barrier Preparations (BNF chapter 13.2)	5,621,000	5,600,900–5,641,100
	Topical Corticosteroids (BNF chapter 13.4)	4,923,000	4,904,700–4,941,400
	Psoriasis And Eczema (BNF chapter 13.5)	180,200	176,800–183,700
2004	Emollient and Barrier Preparations (BNF chapter 13.2)	6,666,300	6,644,300–6,688,300
	Topical Corticosteroids (BNF chapter 13.4)	5,532,300	5,512,800–5,551,900
	Psoriasis And Eczema (BNF chapter 13.5)	216,900	213,200–220,800
2005	Emollient and Barrier Preparations (BNF chapter 13.2)	7,623,900	7,600,600–7,647,300
	Topical Corticosteroids (BNF chapter 13.4)	5,824,700	5,804,800–5,844,600
	Psoriasis And Eczema (BNF chapter 13.5)	241,700	237,800–245,700

for questions used in surveys) from the period immediately prior (1995–1996 to 2000–2001)[17] and intersecting our study period (1995–1996 to 2002–2003)[6] found only a moderate increase in eczema in children (2–15 years), a decrease in older children (13–14 years) and no increase in adults (aged >15 years) over time. Also in contrast to our data, a study using general practice electronic data which intersected our study period (1995–2004) found a steep decline over time in young children (<5 years) presenting with eczema,[18] but similar to our study found increases in adults (>45 years).

Meaning of the study results: possible mechanisms and implications for clinicians and policy-makers

There may be several possible reasons for the increases in eczema diagnosis found in QRESEARCH. One possible explanation is that changes in environmental factors over time have favoured the

Box 2
Questions used in surveys to measure eczema prevalence

Survey	*Question used*
The International Study of Asthma and Allergies in Childhood	Have you (has your child) ever had a skin rash which was coming and going for at least 6 months? Have you (has your child) had this itchy rash at any time in the past 12 months? Has this itchy rash at any time affected any of the following places: the folds of the elbows; behind the knees; in front of the ankles; under the buttocks; or around the neck, ears or eyes?
The Health Survey for England	Have you ever had eczema? Was this confirmed by a doctor?
The European Community Respiratory Health Survey	Have you ever had eczema or any kind of skin allergy?
The Aberdeen School Children Questionnaire	Have you ever had eczema?

Table 5
Comparison of UK epidemiological data for eczema

Source	*Age group*	*Time period*	*Outcome measured*	*Results*	*Change over time*
Isle of Wight Birth Cohort[13]	1–2 & 4 years	1990–1991 & 1994–1995	Symptoms suggestive of eczema in childhood cohort (same children followed from 1–2 years until 4 years)	At 1–2 years 15.9%. At 4 years 11.9%	NA
Weekly Returns Service[18]	0–4 years	1995	Patients consulting for atopic dermatitis/related conditions	240 per 100,000	–72 per 100,000
Weekly Returns Service[18]	0–4 years	2004	Patients consulting for atopic dermatitis/related conditions	168 per 100,000	
MSGP2[16]	< 5 years	1971–1972	Patients consulting for atopic dermatitis/related conditions	90 per 1000	107 per 1000
MSGP3[16]	< 5 years	1981–1982	Patients consulting for atopic dermatitis/related conditions	87 per 1000	
MSGP4[16]	< 5 years	1991–1992	Patients consulting for atopic dermatitis/related conditions	197 per 1000	
UK National Cohort[14]	5–7 years	1946	Parental reporting of eczema	5.1%	7.1%
UK National Cohort[14]	5–7 years	1958	Parental reporting of eczema	7.3%	
UK National Cohort[14]	5–7 years	1970	Parental reporting of eczema	12.2%	
ISAAC Phase One[6]	6–7 years	1995–1996	12-month period prevalence self-reported doctor diagnosis	13.0%	3.0%
ISAAC Phase Three[6]	6–7 years	2002–2003	12-month period prevalence self-reported doctor diagnosis	16.0%	
Aberdeen School Children Cohort[15]	10.6 years (mean)	1964	Self-reported prevalence	5.3%	16%
Aberdeen School Children Cohort[15]	10.6 years (mean)	1999	Self-reported prevalence	21.0%	
HSE[17]	2–15 years	1995–1996	12-month period prevalence self-reported symptoms	23.0%	1%
HSE[17]	2–15 years	2000–2001	12-month period prevalence self-reported symptoms	24.0%	
ISAAC Phase One[6]	13–14 years	1995–1996	12-month period prevalence self-reported doctor diagnosis	14.7%	–4.1%
ISAAC Phase Three[6]	13–14 years	2002–2003	12-month period prevalence self-reported doctor diagnosis	10.6%	
HSE[17]	> 15 years	1995–1996	12-month period prevalence self-reported symptoms	13.0%	0%
HSE[17]	> 15 years	2000–2001	12-month period prevalence self-reported symptoms	13.0%	
Weekly Returns Service[18]	45–64 years	1995	ICD code for atopic dermatitis and related conditions	6 per 100,000	4 per 100,000
Weekly Returns Service[18]	45–64 years	2004	ICD code for atopic dermatitis and related conditions	10 per 100,000	
ECRHS Phase II[7]	1999–2001	27–56 years	Lifetime prevalence of eczema in UK	8.1%	N/A
Weekly Returns Service[9]	>65 years	1995	ICD code for atopic dermatitis and related conditions	6 per 100,000	8 per 100,000
Weekly Returns Service[9]	>65 years	2004	ICD code for atopic dermatitis and related conditions	14 per 100,000	

ISAAC = International Survey of Allergy and Asthma in Childhood; MSGP = Morbidity Survey of General Practice; HSE = Health Survey for England

expression of allergic disease in those who are genetically susceptible.[2,19,20] There may also have been increases in sensitization over time, which may then in turn predispose the development of any of a number of allergic disorders. Supporting evidence for such a possibility comes from an important study by Law *et al*., which found significant increases in atopic sensitization in the UK over a 25-year window.[21] Increased predisposition to atopy,[22] possibly reflecting changing exposure to known and unknown risk factors,[23] may also be important. Increases in the rate of these conditions could however result from increased clinician awareness of allergic problems, which may then have led to improved identification and recording of eczema. Similarly, increased patient awareness, or parental awareness of the potential of accessing effective treatments, may have resulted in increased case presentation and prescribing in primary care.

Given the high prevalence of eczema, particularly in younger children when compared with adults, the overall numbers of people in England with eczema is, for the present at least, likely to continue to increase. A key related important unanswered question concerns the quality of care and symptom control for parents and carers of younger children,[24] particularly as eczema is most symptomatic at this younger age and is likely to herald the onset of other allergic conditions.[25] Efforts must therefore be directed into investigating effective methods of primary prevention and symptom control, particularly as high levels of consultation rates for this growing population will persist into older age, with an associated substantial impact on the NHS, and in particular primary care. The House of Lords Allergy Inquiry published in 2007 has identified several issues highlighted by this work and other previous research that require further attention.[26]

Conclusions and future research

This large national study reveals that the recorded incidence and lifetime prevalence of patients with eczema increased in England. With almost 1 in 9 of the population having experienced the condition at some point in their lives, eczema is now one of the most common chronic conditions to effect the English population, and therefore continuing monitoring of trends is very important. Whether these findings reflect a genuine increase in the incidence of eczema, improved awareness, diagnosis and recording in primary care, or, perhaps most plausibly, a combination of genuine increases and improved identification and recording, is a question with important public health implications and one therefore that warrants detailed further enquiry.

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